S'COOL BREEZE

Student's Cloud Observations On-Line

Volume 1, Issue 6 September 1999

Singing for Science

Words by Suzy Gazlay ,1996

Water Cycle

Tune: Are You Sleeping?

Water cycle, water cycle
All around, this we've found
Here is how to do it,
Water moves on through it,
Here and gone, moving on.

From the ocean, lakes and puddles,
To the air, everywhere.
Rain or snowy weather
Bring it down together
To the ground, round and round.

Evaporation, evaporation:
Condensation, condensation:
Precipitation, precipitation:
Accumulation, accumulation.

(Contact Suzy for more science songs.
Singing Sci@aol.com)

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Message from Dave

Message from David F. Young, Research Scientist in the Radiation Aerosols Branch of the AS, NASA, Langley Research Center, Hampton, Virginia.

The S'COOL Project has been developed with two primary goals. First, this project is intended as a tool for assisting the teaching of science, math, and language skills. Second, the project strives to get the students involved in an actural on-going scientific investigation. Much work has gone into the design of the project so that CERES scientists will be able to actually use the students' observations for testing the validity of the CERES cloud measurements.

One of the most common questions asked about S'COOL by our colleagues in atmospheric science is whether we truly intend to use these data. Certainly, there are other cloud observations available. The United States National Weather Service and its sister organizations around the globe provide regular observations of clouds. Shouldn't CERES use these observations made by professionals instead of data collected by eager, yet untrained, students?

The answer is that we don't have to choose. We use both. The S'COOL observations are an important complement to standard meteorological data for several reasons. The most important difference is in the time of observations. Standard weather observations are taken at particular, fixed times each day. The S'COOL students make their observations as the satellite passes overhead. This time matching is extremely important since clouds are very changeable. As we will demonstrate in the second part of this article, comparisons become increasingly difficult

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Scientific Value (continued from page 1)

as the time difference increases.

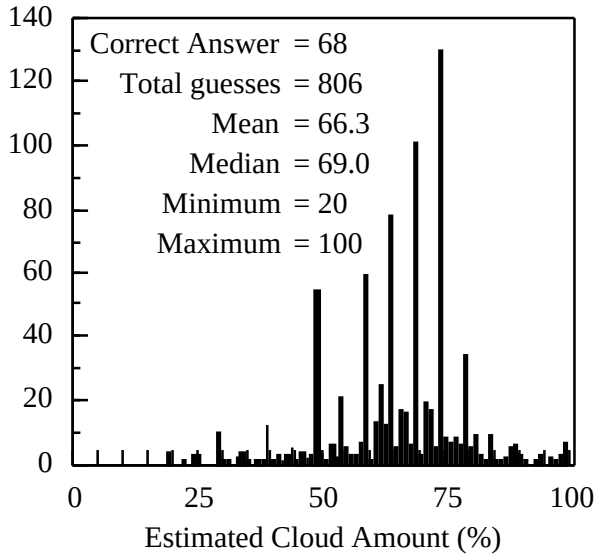
A second key difference is that the S'COOL observations have been tailored to provide the exact data that we need for our study. Satellite-surface comparisons are very difficult without proper coordination. Great care has been given to the design of the S'COOL reporting form so that the students provide data that are both simple and useful.

Finally, comments from the students are invaluable. This part of the S'COOL reporting form is overlooked by some of our participating schools. When we have cases where the CERES and S"COOL data appear to disagree, the comments can often be used to solve the mystery. Knowing that there is patchy snow cover, or fog in a near-by valley, or that it recently stopped raining can mean a lot to scientists as we try to interpret what we see from our satellite. In fact CERES scientists have already closely studied a few selected S'COOL cases while testing our satellite cloud detection methods.

But what about the question of training? Can students provide data of sufficient quality to be used for science? Absolutely. Although we know that mistakes will be made along the way, these can be allowed as long as we collect a large number of observations and interpret them properly.

To test the accuracy of students' estimates of cloud amount, we have been conducting an on-going statistical experiment called "Guess the Cloud Amount". Students are first shown a picture that contains 100 clouds. We then explain that we will next show another picture with some of the clouds missing and that we want them to estimate how many clouds remain. The students are then shown the picture for 10 – 15 seconds, which is not enough time to actually count the clouds. Each student writes their guess on a piece of paper and the answers are tallied.

Over the past two years, 806 students from 25 classes have participated in this exercise. The following figure shows a histogram and a summary of their cloud estimates.



So what do these results tell us? First of all even though there have been estimates ranging from 20 to 100, the overall average of the data is within 2 of the correct answer. The median of the students' guesses is even closer. In spite of the fact that only 16 of the 806 students correctly estimated 68 clouds, the mean estimate is still very accurate. The power of using the mean of multiple measurements can also be demonstrated on a smaller scale. Only three of the 25 classes had a class average that differed from the correct answer by more than 5. Most of our S'COOL teachers have taken advantage of statistics by using groups of students to make the observations for the class, thus getting a better result than by one student alone.

Based on this experiment we expect that comparisons with a large number of S'COOL measurements will provide the CERES science team with valuable information. In the next newsletter, we'll show the results of the first comparison of the students' cloud observations with actual satellite measurements. Until then, keep sending in your observations- we're looking forward to working with all of you.

* * * * *

Did You Know?

The satellite TERRA was named by students. It is scheduled to be launched Oct. 9, 1999.

NOTES OF INTEREST

TEACHERS ATTEND S'COOL

While their students were enjoying the last few days of a summer vacation some of our local S'COOL teachers participated in a week long workshop at Langley Research Center. One of the goals was to share ideas and create new lesson plans. Speakers and tours rounded out a full week of activities.

We want to thank all those who came and made such worthwhile contributions. We hope our budget will allow us to expand this effort to a broader community in the summer of 2000!

TRY THIS

TO SWIM OR NOT

MATERIALS:	**SAND**
2 PLASTIC SHOE BOXES	**WATER**
2 RING STANDS	**LAMP (100W)**
4 THERMOMETERS	**STRING**

DIRECTIONS

1. Fill one shoebox with sand and the other with water. Place both equal distance from lamp.
2. Calibrate thermometers.
3. Place one thermometer in each of containers, partially submerged. Suspend the other two above the surface by securing with string to ringstand.
4. Turn lamp on and record temperature of each thermometer every half hour for 3 hours.
5. Turn lamp off and record every half hour for 3 more hours.
6. Use data and create a line graph of each.

CONCLUSIONS

1. Where was the highest/lowest temperature?
2. Relate this to changes around water. Why is it sometimes uncomfortable to swim in the early summer when the air is warm?

***French translation by Stephanie Weckmann**

Student Benedicte from Martigny, Switzerland, shows how to conduct ground truthing during summer vacation!

Virginia S'COOL teachers record their observations during the summer S'COOL workshop held at Langley Research Center in Hampton, Virginia.

Teacher Corner

- S'COOL NOW HAS 299 SITES ENROLLED IN 22 COUNTRIES ON 6 CONTINENTS.
- Do you have an new e-mail address? Please notify us.
- New teachers, past issues of newsletters are on the website. Check them out for ideas and lots of information.
- Student pictures, art and language contributions are welcomed for newsletter.

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Upcoming events

S'COOL Presentations at
Regional NSTA Conferences in
Detroit, MI, Tulsa, OK, Reno, NV
And state conference in WV
USA

Terra Launch/ October1999

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